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we see actually done in sunlight; and thus whoever can, without altering the quantity, effect this change in the quality of the radiation from gas, will add millions to the national wealth.

S. P. LANGLEY.

THE NEW-YORK AGRICULTURAL EXPERIMENT-STATION.

THE weekly bulletins of the New-York experiment-station, although "intended to inform the public of progress at the station rather than to give complete results," nevertheless contain some matters of interest.

Seeds.—A series of weighings on light and dark colored seeds of several kinds showed, that, in every case, a hundred dark-colored seeds were heavier than the same number of light-colored seeds. The dark-colored seeds were also found to contain a larger percentage of seeds capable of germination. Sprouting-trials with onion-seed of different ages indicated that seed over two years old is of little value. Confirmation was obtained of the results of Will on the germination of seeds, reported on p. 176 of SCIENCE. Out of a hundred kernels of corn, eight germinated for the fifth time after drying in the air. Both field-experiments and sprouting-trials showed a decided superiority, as seed, of corn taken from the tips of the ears over that taken from the butts or the middle.

Potato-culture.—The terminal eyes of the potato were found to germinate more promptly and vigorously than the basal eyes. The best crops were obtained, and at the least expense of seed, by cutting the potatoes to single eyes, and so cutting them that each eye retained a portion of the tuber extending as far as possible towards the central axis. Each eye may be regarded as the terminal bud of a branch extending from the central stem; and the potato should be so cut that each bud may retain all, or nearly all, of its branch. The conditions favoring the production of potatoes seem to be moisture and coolness for the roots, and warmth and dryness for the tubers. Culture which supplied these conditions, such as ridge-culture, and, still more, covering the seed-potatoes with four or six inches of sand, gave a large increase over level culture.

Root-development.—By excavation and washing, the development of the roots of several species of plants has been traced. Corn seemed to have two systems of roots,—one of fibrous roots, developing chiefly in the upper and warmer layers of the soil; and the other of coarser roots, passing downward into the subsoil. The hypothesis is advanced, that the former system serves mainly to supply the plant with ash ingredients, and the latter with water, and perhaps nitrogen. Wheat and potatoes appear to be deep feeders, developing their roots more abundantly in the lower and cooler layers of the soil. Tobacco, on the other hand, is a shallow feeder, like corn.

Feeding-experiments.—A single determination of the digestibility of corn-ensilage gave the following percentage results:—

Proteine	51.89
Fat	79.17
Crude fibre	60.91
Nitrogen free extract	67.59

The figures for proteine particularly are lower than those given in Kühn's tables of digestibility; and the conclusion is drawn, that the process of ensilage has decreased the digestibility of this in-

gredient. The conclusion is, however, entirely unwarranted; for the figures simply show that the ensilage was less digestible than Kühn's corn-fodder, but show nothing whatever about the digestibility of the corn-fodder of which this ensilage was made.

A series of feeding-experiments on milk-cows was carried out, the fat in the milk being determined chemically, while, at the same time, the butter obtainable from it was determined by actual churning. The interesting result was reached, that, with different rations, the amount of butter fluctuated much more than that of the total fat: in other words, the feeding seemed to make a difference in the completeness with which the butter could be extracted from the milk. A ration of shorts and hay gave the best results in this regard. Other interesting minor results were obtained, but the main object of the investigation is not very apparent from the account given in these bulletins. The coarse fodder was eaten *ad libitum*, the amount of water drunk was not regulated, and no sufficient data are here presented for a comparison of the different rations. It is to be presumed, however, that some of these deficiencies will be supplied in the formal report of the station.

An analysis of the milk of fatigued cows showed that it was quite phenomenal in character, the total solids being nearly a third greater than the normal amount, and the increase being nearly all in the fat.

H. P. ARMSBY.

CLASSIFICATION OF ISLANDS.

A. KIRCHHOFF (*Kettler's zeitschr. wissenschaft. geogr.*, iii. 169) presents some criticisms on Peschel's and Wallace's work in this direction, and proposes the following table. A, Festländische Inseln: a, Abgliederungsinseln; b, Restinseln. B, Ursprüngliche Inseln: a, Submarin eustandene vulkanische Inseln; b, Aufschüttungsinseln; c, Nichtvulkanische hebungsinseln. The first group includes those derived from a continental land-mass, either by submergence or seashore erosion, the latter being uncommon. Its first subdivision (dismemberment-islands?) are found along the borders of existing continents, and are very numerous. The second subdivision (remnant-islands?) would include the last surviving summits of a drowned continent; but no examples are surely known, unless those of the Antarctic Ocean belong here. These continental islands might be of volcanic rocks, for the higher points of many existing continental districts are of volcanic origin: they are not necessarily of varied geological structure, as described by Wallace. Witness the monotonous low quaternary islands along the German seacoast. And, while it is true that land mammalia and amphibia are wanting on islands of the second group, it is an error to say, with Wallace, that they are always present on those of the first. Wallace recognizes that elevation, after a complete though short submergence, would reveal the island bereft of its earlier continental fauna, but finds no examples of such a result. Kirchhoff adduces the Halligen Islands of the North Frisian group as such examples; for their low surface is frequently submerged by high winter tides, leaving only the huts crowded on artificial mounds above water. They have no mammals (except the domestic); moles are unknown in their green meadows; nor have they toads or frogs. Larger examples of the first group are seen in Greenland and the archipelago north of British America; in the West Indies, once connected with South America, Florida being of comparatively modern extension towards Cuba; New Guinea; and Borneo.